RELEASE 1.0

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INK OVER CHARACTERS

Thinking of the pen as second-rate keyboard is like thinking of a bicycle as a second-rate car. The pen works better on its own terms.

Many people question the value of pen-based computing because handwriting recognition is still crude. However, they're focusing on the wrong issue. Assuming that you need near-perfect handwriting recognition assumes that the computer needs to understand what you're doing. In fact, in many cases all that's needed is that *you* or some other person understand what you've written -- and that you tell the computer enough about it so that it can handle it appropriately. The computer doesn't need to know what's going on.

For example, take a hastily scribbled "Juan c/o Alice on Tues." The computer might be able to give you "Juar CIO *lice on Tues." But what you need isn't that; you really want it to know that any messages for Juan Tigar, the accountant who's working on the year-end update, should be forwarded to Alice the lawyer on Tuesday.

In this case, perfect handwriting recognition would give you both more and less than you need. What you really need is the object representing Juan, not a string of text. You may want to redirect e-mail messages for him, or you may want to change his telephone number temporarily so that you can call him yourself.

On the other hand, you may be scribbling notes to yourself on what to tell Alice about the contingent liabilities of your aggressive new ad campaign. These aren't things that you want the computer to understand or to handle, although you want them filed under "ad campaign," under "liabilities," under the date of the meeting, and perhaps "lawyers" or "legal" or "Alice Haynes." (Or perhaps you want to erase the evidence entirely!)

But back to Juan. How do you get your scribble associated with the real object, the person with a name and a job function and a correspondence file? You could type in an ID number, or have the computer recognize your scribble (if you carefully added the last name and the name of a file to look in). But it's much quicker to use a pen to select from a hierarchy of menus: people, T, i, yes, that one! Now you move to a date book to find next Tuesday...and so on. (This same approach would also work with voice recognition.) ⟹

CONGRATULATIONS, LAYNE & JERRY!

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Don't understand me, just classify me

Thus the issue isn't text recognition but the proper handling of the "ink" produced by the user with his pen, whether recognized as characters or not. The ink may be an annotation, to be kept with a certain named range (which may move from cell to cell) in a spreadsheet, or attached to a personnel record, or assigned to a certain day. It can be moved from day to day if the appointment changes.

And it is handled by reference to the item it's attached to. It can be classified in most ways any other piece of data can be classified. It can also be enlarged, copied and attached to every first Monday of the month, faxed to someone else, or displayed. It could even blink or be displayed in red on a color monitor, according to who had entered it, or whether it was on a to-do list and assigned to a date that had passed.

The value of ink comes mostly in its interpretation by a human -- stored and handled by a computer without passing through its "mind." Take a crude map showing how to reach Grove Court, for example. Or a note to your boss justifying the dinner at the Quilted Giraffe. (The note is directed to your boss, even though it is first received by an expert system. The expert system notes that your dinner was too expensive and flags your message as a "reason for exception" because of where it was entered on the form -- and forwards the whole thing to your boss, who makes the final decision.)

Or take a mock-up of a flag for a new country. Someday it may be transferred into thousands of design programs, fabric-cutting programs and logos, but for now it's just something to show to a committee. Or, finally, it may be a signature: Its meaning would be lost if it were translated.

Quadraphonic sound was supposed to be so much better than stereo because it gave us those two channels of sound. But could you really tell the difference? Pen-aware [as opposed to pencentric] applications are the quadraphonic sound of pen computing... Pencentric applications will be the CDs of pen-based computing.

-- Vern Raburn, chairman, [clean] Slate Corp.

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AUTOMATING SYSTEMS INTEGRATION: A TASK FOR OBJECTS

Do you want to be truly object-oriented? Or do you just want the benefits?

While the benefits for developers pretty much depend on how the code itself is structured (and made easily reusable), many of the benefits for users can be delivered without going all the way to Smalltalk, inheritance and other such things. These benefits of object-orientation have more to do with the associated hygiene and the behavior of objects than with the underlying technology.

One of the basic features of objects is self-description, whereby an object identifies itself and its functions and protocols (or how you address an object to make use of its functions and get at the data it controls). Just as objects describe themselves formally, applications can describe themselves too -- and the more explicitly and precisely, the better. The application can be identified as a whole or better yet, as a set of coherent modules. The primary beneficiaries of self-description are not developers, but users trying to get their applications installed and working together.

The benefits of self-description are that other people and applications know what an object can do, and what to do with it. In addition, you can tell which modules (or the applications they comprise) can interoperate effectively, and you can select the modules you need (otherwise known as reuse) to construct new systems. By analogy, consider your interactions with a small staff. You work closely together, and understand each other. But the moment you move to a new environment or hire more people, it becomes more important to have precise job titles and responsibilities. This enables you to do three major things: assemble the right team of people, with complementary skills and abilities; delegate to them and have them share the work effectively; and three, pay them appropriately. Call these system installation and configuration; application scripting and interoperability; and resource allocation and financial management.

System administration: Problems encourage solutions

Aside from C++ programmers, who's working with self-describing applications? As it happens, the time is right: The proliferation of pcs and applications and networks has led to a common interest in self-description. The two most interested communities outside the (self-defined) object-oriented folks are those interested in the benefits we mentioned: (1) the ability to build scripts and let applications communicate (see **Release 1.0**, 5-91), and (2) easier system configuration, installation, administration and trouble-shooting.

The system configuration people are responding to the immediate challenges of putting the right tools and applications together on a changing installed base, with more and more pcs networked. There are too many pcs to leave the problem to individual users; there are also too many pcs and possible configurations and applications for an administrator to handle it without tools. Meanwhile, the scripting folks are interested in actually using the applications. (Among other things, they can use scripts to automate the tasks the integration community faces, including the collection of data, the installation process and any necessary problem-resolution procedures.)

A third interested party is financial managers and such, who are more interested in the identity of the modules and perhaps their usage; this will become an increasingly important area for the management of site licenses and more complex pay-per-use, pay-per-user and pay-per-transaction schemes. This has not yet taken broad hold in the commercial pc world, but they will. Both the electronic distribution of software and the increasing modularity of applications, as well as users' desire for a "fairer" way of paying, will lead to the need for better record-keeping in distributing and installing class libraries, and in monitoring their use, in the future. That requires a way to determine just what functions a customer is using. (Similar issues apply in the distribution and usage of text information; see **Release 1.0**, 4-91.) Self-description is also a foundation for internal resource allocation, as described by Bernardo Huberman of Xerox PARC and others (6-89).

We have already discussed scripting (in our May issue). In this issue, we consider installation, configuration management and system administration. Fundamentally, though, all three capabilities (administration, scripting and resource management) depend on the ability of applications to look more and more like objects to the users and agents around them, regardless of their internal construction.

POLITICALLY CORRECT SYSTEM ADMINISTRATION

In the end, everything we're talking about here leads towards the notion of an Object Request Broker (see **Release 1.0**, 3-91), with knowledge throughout a system of what objects any object can call on and how to find them. (Yes, that's a little ambitious!) It also leads towards the all-singing, all-dancing object-oriented environments promised by IBM/Apple ("Pink"), Microsoft ("information at your fingertips"), the Object Management Group (HP/SunSoft/NCR/ODI/Bull/DEC/HyperDesk et al.) and virtually every platform company big enough to afford a marketing department. Will they work together? Fortunately, there's time enough to worry about that in the distant future.

To automate the task of systems integration, let alone do it correctly, we need a way to represent the accumulated knowledge, wisdom and techniques of systems integrators/administrators in software. That requires handling the applications intelligently, as objects (loosely defined) rather than files. The systems discussed here are tactical, not a global solution, but they don't need to be. No single entity is capable of managing everything; control must be localized, even though each unit must be able to communicate with the others.

Some preliminary solutions

The operating environment of the future, of course, isn't just what sits on your desk, but what connects the desks and maintains the system. Many of the problems of networking result from separation between the vendors of the standalone client system and the network operating system. That's why the merger of Novell and Digital Research is so significant.

In the Apple world, Apple controls both the network and the desktop, which is a significant advantage. In addition, the Mac enforces strict controls on application formats and requires a facility for self-description called the resource fork. This makes the Mac tougher to develop for, but the users reap the benefits. (UNIX systems also cover both ends, but there's not much commonality enforced on applications.)

We explore three broad areas:

- A number of products now appearing for the Macintosh environment that manage user applications over a network.
- Microsoft's evolving approach to application registration for OLE and beyond, which could provide a basis for similar capabilities.
- The potential merger of the products -- as opposed to the organizations -- of Novell and Digital Research.

MAC LEADS THE WAY

Among existing commercial operating system platforms, the Macintosh is by far the leader towards object-orientation (or "object-leaning"); as Apple's Larry Tesler puts it, "AppleEvents is a surreptitious way to make applications look object-oriented." Other object-oriented platforms include NeXT, HP NewWave and a variety of software-only environments from smaller companies, but none has the Mac's market share.

So far pc software vendors and users have worried more about applications' compatibility with the operating environment than with each other, and more about compatibility -- can applications coexist -- than interoperability -- can they cooperate? But that is changing with the advent of multi-tasking operating systems and cooperative processing.

Interoperability and visibility

The Mac environment already shows the benefits of this object-leaning.[1] Although self-description does not by itself guarantee interoperability, it's a vital aspect of encouraging and implementing it in the real world. To make interoperability easy, so that applications needn't be hard-wired together, applications need to appear not as monoliths but as collections of data types and functions -- something midway between objects and the current style of file-oriented applications.

Then, the application components need to be interoperable. And finally, they need to know of each other's existence: Applications can't communicate with other applications that they don't know are there. That requires self-description.

Note that we're not talking about esoteric functionality. We're talking about simple things. If applications were aware of each other in general -- instead of with particular hard-wired links such as will happen between, say, cc:Mail and Lotus Notes -- your pc word-processor would automatically grow an extra menu item to let you send e-mail the moment you installed a

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1 *The issues in the copyright suit, the Mac's look and feel, are only the interface; more important, and harder to copy easily, are its underlying behavior and the installed base of self-describing applications.*

new mail transfer agent. Instead you probably save your wp file, remember the name, and pick it up with your wp as an attachment. Right?

Or take printers, which generally have published interfaces for use by a variety of applications. "The printer is the water cooler of the Nineties," says Jim McCarthy of the Whitewater Group -- a technically aware group if there ever was one, but DOS- and Windows-oriented. "There's always a couple of us hanging around the printer, waiting to see what's coming out. We can't tell! And we certainly can't get in there and change the priorities." We have another problem: We have two paper trays, potentially with two kinds of paper, but we don't know how to switch from one to the other. Can the printer tell us it's out of paper, let alone which kind? Well, it can if it's on an AppleTalk network. And it can if it's on a pc and someone went to a lot of trouble to hook it up to our particular applications.

For example, your pc could inform you, "Now printing Juan's WordPerfect document called 'Your eyes, your eyes' 4K. Queue contains Alice's 1-2-3 spreadsheet called 'Worst-Case 1992' 20K, Admin's Paradox report called 'Monthly mumble' 79K, Mr. Big's EasyWriter document called 'Sales Targets' 8K." And then it could ask, "Change priorities?"

Technically, these things should be easy. It is (relatively) in the Mac world, where there is a widely used standard way for users, applications and tasks to identify themselves. But it's tougher in the pc world: You typically have to *tell* a new pc application about your system configuration, your network, your printer. And nine times out of ten there *is* no way to tell it about your e-mail package, your address-printer or your output-to-fax. Someone has to write a little script that will trick it into thinking the e-mail is a printer and grab the print file at the right moment.

On both pcs and Macs most applications are still like a secretary that can't speak about the work he or others are doing, even though he can *do* the work. You give the application the task, and sometime later you get the work back. But you don't know what else the system is working on, what priorities it has, and even if it heard you right. Can the word-processor, the printer and the fonts work together? Stand by at the printer to find out.

The Mac's resource fork

The beginning of the answer is the Macintosh's resource forks, which every conforming application includes. They list each application's unique ID (catalogued by Apple), its version, memory requirements and so forth. The resource manager manages this information and answers queries by products such as those described here. Similarly, the "Gestalt" call allows an agent to find out about local hardware and system configuration, returning about 40 pieces of information (sort of a "get info" for configuration tools).

The resource forks, Gestalt and other items supply the information that the Mac configuration tools described here need, although not yet all of it. For now, most of them simply handle the interactions of systems components: processor, peripherals, networking software, and so forth. Some also use the Apple Compatibility Checker, a HyperCard stack which lists vendors' assertions about the compatibility of their applications with System 7.

What's still generally missing is information about the interactions of applications, data formats, fonts and other application-oriented modules

jaNETor in a box (still a dream)

Long ago -- three years ago, to be exact -- we wrote about a dream product called jaNETor. Everyone was talking about network plumbing; jaNETor was the tool that could manage the plumbing. jaNETor monitors and manages network systems and configurations, and can assist people in automatically installing new software, balancing the use of storage and other resources, managing versions and configurations and so forth. jaNETor, of course, contains both expert systems and troubleshooting procedures. It also knows how to install each particular piece of software (and each version) that comes along. It can manage device drivers, resolve memory conflicts, and it can figure out what to do in most UAEs, or Unexpected but Anticipatable Events.

This is obviously the ideal product to handle the heterogeneous world and combinatorial explosion of disparate modules we're facing. Yes, it's a tough job for software to handle; it's an even tougher job for humans to handle!

There are two basic approaches to the issue: from the server down, and from the individual up. (The the strong-central-hand vs. the federation approach.) You can either treat system administration as an extension of network management, or you can look on it as a way for the individual user to offload the work (but not the control) to an automated agent. The network-oriented approach basically moves from the hardware to the operating environment and on to the applications. This approach typically starts with network administration.

The other approach starts with applications and works in. It considering applications first as monolithic things -- you have X installed or you don't -- and then moves into attributes and modules -- the kinds of data functions expected, the version used, which options are available and so forth. This approach generally starts with the individual, and sees network facilities as just more objects.

What jaNETor needs to do its job

jaNETor has some aspects of an expert system, but mostly it's an execution tool: Its internal expert system figures out the situation, and then it does the right thing. But where does it get all this information? How does it know what to look for, and how does it know how to handle all the different combinations of configurations? An experienced system engineer does this by poking around a system, asking users what they have, and then reading documentation. Then, typically, he calls the vendors.

Thus jaNETor needs the applications and operating environment components to describe themselves to make its operation efficient and automatic. That is, jaNETor needs a powerful sponsor to persuade applications vendors to provide self-describing applications (until everything comes up objects). As we said in August 1988, "jaNETor's knowledge of the specifics of a wide variety of environments [and applications] is its primary value."

among themselves. Of course, this depends on the availability of the information -- and on the vendors' honest self-reporting. Ideally, the information would be published in some form that software could interpret. Such information would be voluminous, continually out of date and difficult to manage. On the other hand, that's why it's worth having and selling.

Manage your update

Even with the limited amount of information now available a profusion of update management tools is entering the Mac marketplace: They let you automatically ship program files to client systems on a network, and then (with varying degrees of automation) the new programs are installed.

Some let individual users approve or decline the process; others just take over and do it regardless. But they generally make the assumption that the machine is online, and don't always gracefully handle the follow-up for users whose systems weren't available the first time around. They also suffer from somewhat imperfect integration, even within a single tool: First you use one process to find out what people have out there; then you use another to ship the desired updates, and so forth. Although most of them have solved only part of the problem, some of them are starting to work together.

The role of standards

It's the lack of standards that produces the combinatorial explosion that makes system administration so difficult. The Apple environment is only standard within itself, but in that world things are tightly controlled. The DOS world, by contrast, is unstandardized. The NetWare/DR DOS tie-up will make a more standard environment for system management, while Windows is moving towards broader standards on clients and Microsoft will use that base to integrate with and promote LAN Manager. Meanwhile, application standards for such things as data formats and functions are making cross-application communication easier, even as the proliferation of applications and functions makes the jobs harder. It's basically an arms race between new capabilities and new standards...

Handling the current range of applications and environments is the primary concern of these vendors today; objects are off in the future. This focus on the current situation accounts for the tactical rather than strategic approach of most vendors.

These firms are most actively involved in automatic system configuration:

- Pharos with Status*Mac and Personal*Status;
- Teknosys with Help!;
- TechWorks with the GraceLAN line (including GraceLAN Asset Manager and Update Manager);
- MacVONK with NetOctopus, developed by B&L Impuls Software of Germany;
- Trik with NetDistributor;
- CSG Technologies with Network SuperVisor; and
- SoftWriters with Version Territory.

Most of these tools still pretty much rely on the administrator to know what's going on -- and to detect potential conflicts beyond simple things such as memory overload. The administrator queries the system, finds all the users with Excel 8.3 and more than 30 megabytes of memory. Then he ships a "package" (the new files plus an installation script) out to the users, and the script installs the software. That process, at least, has generally gotten easier, especially on the Mac.

The components of all these tools are similar, although not all of them include all the components. They include:

- a tool that can query the resource forks and other system files to find out what a user has installed, sometimes called a responder, because it responds to the administrator's requests for information.
- a core of knowledge about Mac environmental requirements for memory, storage, peripherals, security, System 7 compatibility, etc.
- an installation tool to create "packages" of the desired applications and other resources (drivers, fonts, etc.) for automatic or semi-automatic installation, and to carry out the installation, frequently across a network.
- additional information about specific applications and their interaction with the OS and with each other.
- an expert system to detect conflicts or potential problems.
- facilities for resolving problems and conflicts, which could be scripts to move or remove some files, or messages to the user, including such messages as "Call the vendor at 1 (800) TOO-BUSY."

None of the components are magic. Working together, they can automate much of a system administrator's work, and enable him to manage a fairly large installed base of Macs. They vary in the degree of autonomy they allow the individual user: Can he decline an upgrade or reschedule it? And they generally use a two-step process: Find all the machines with given configuration characteristics (memory over 2MB, for example, and Version 2.4 of WrongWriter); then you can send the upgrade package to all the machines on that list. But it's relatively simple to collapse that into a single step.

The last three components -- information about application interactions and the tools to use it -- are the new, exciting ones. These are the capabilities that set Pharos and Teknosys apart.

Pharos's Personal*Status, code-named Whirlwind and scheduled for release by the end of this year, should be one of the handiest tools for jaNETor (see across) that we've ever seen. Personal*Status uses the same profiling capabilities as Pharos's Status*Mac, which is basically a resource file reader for use by system administrators or locally. In a sense, Personal*Status replaces the expertise of the system administrator for an individual user. It will come in a script-builder version (priced "in the high hundreds or low thousands") and runtime (less than $100) versions. The users of the builder version are generally application builders or in-house system admin-

istrators building scripts to install and manage complex configurations of commercial applications and their own in-house applications.

The developer version of Personal*Status is an installation scripting tool that uses local configuration data in conjunction with a core knowledge base of general systems information plus application-specific configuration rules and scripts. The runtime component manages the appropriate scripted installation procedures (Pharos calls them agents) and uses the configuration information provided by Status*Mac, fixing potential problems if it can, or reporting why there could be a problem. (It can also be used for after-the-fact check-ups, of course, noting problems likely to happen, old versions of software, incompatibilities, etc.)

While Pharos does the basic work and provides core scripts for generic problems, it is also trying to bring application vendors into the act. Each vendor (or inhouse developer) can take responsibility for documenting and scripting -- in machine-intelligible form -- its own installation procedures, new versions and configuration requirements.

Beech is now approaching application developers to sign on; he's currently negotiating an agreement with another Mac-oriented vendor that should help in this regard. "We'll send vendors a letter documenting problems or procedures we've found, and say 'What do you think? Do you agree with our solutions, or would you like to do your own?' Then we hope they'd prefer to do it themselves," he says. Smaller vendors, of course, will have no choice but to do the work themselves. The hope -- a realistic one -- is that the vendors will see the scripts as a way to add value to their products as well as to reduce their support costs. In the same way, inhouse developers will find it a useful way to proliferate applications through their companies -- or even through their agent bases, such as insurance agents or brokers.

How will the scripts be distributed? That's still unclear. Obviously, Beech hopes many vendors will include scripts with their applications, but he also sees a place for distribution before purchase, for queries such as, "I want to use PageMaker 8.2. What do I need?"

Unlike the other tools here, Personal*Status is designed to be used by a single user on a single machine, although it can run centrally developed scripts delivered over a network by a systems administrator via Status*Mac. Pharos founder Bob Beech, a former computer consultant among other things, is a fierce believer in the *personal* aspect of pcs, positioning himself in opposition to the network-management crowd. He focuses on people, local control and all those other good things, while striving to foster information and standards so that all those individuals can use their unique configurations and still communicate and operate effectively in a linked world.

While Teknosys, for example, basically works off a database of products and interactions, Personal*Status lets an individual product look at the other products it has to interact with. This is a small technical difference, but it informs the way the products work and the kind of users they'll attract.

Teknosys spends more of its own effort on discovering the information, and plans to publish its **HELP!** executable knowledge base four times a year, but it has worked less on automating the installation/configuration tasks, al-

though it plans to add a module to do so later this year -- about when Personal*Status should be shipping. The Help! knowledge base consists of information gleaned from printed materials and help files from vendors, electronic and print media reports, information from Apple, user bug and conflict reports, and its own test results. Whereas Personal*Status keeps the information in the form of application-specific agents that know what to look for and mange the installation process, Teknosys applies a more global approach, maintaining a single knowledge base that's compared by a user or administrator to an individual user's configuration. The system is more focused on providing information for a user, a help desk or system administrator than automating the process of installation; it produces a full WYSIWIG report on potential conflicts and suggested remedies.

Teknosys has gotten enthusiastic response from its beta customers (including Lockheed, US Sprint, BP Oil and Oberlin College) and they have promised to contribute to its database. "Our challenge is to make developers realize this is an opportunity for them to reduce their own support costs by giving us information," says marketing manager Jay Stipe. "And it's not our interpretation of the problem; it's their own message to their customers." The product, shipping next week, will cost $149 including the resource checker, and quarterly updates will cost another $75 a year.

The company started out in 1988 in the systems integration business, and started thinking about an application-installation tool about a year ago, says founder Steve Smoot, who held many high-level systems architecture posts at GTE Data Services. "We wanted a short-term money-maker that didn't take a lot of time," he says. However, he wasn't alone, and the sudden appearance of the products listed here made him change goals to something more ambitious -- the current product. The company should do a little over $1 million this year, half products and half system integration work, but he hopes that Help! will grow to a much larger proportion next year.

TechWorks GraceLAN provides the local configuration information for an administrator to use. The information is provided as reports in response to query templates. As of this fall, that information can also be loaded into GraceLAN Asset Manager, a 4D database application that lets administrators manipulate the information much more flexibly. They can also include a variety of external information, such as prices and vendor information. You can use it to manage vendor relationships, track ownership or repair history, monitor use of supplies, etc. The system is pre-loaded with product information (model numbers, warranties, list prices, support phone numbers, etc.) -- one megabyte in all. It will probably include two free updates -- a year's worth.

In addition, GraceLAN will also send information to the forthcoming GraceLAN Update Manager installation product (for Mac applications over an AppleTalk network only). This tool enables you to create update packages, send them out over a network to upgrade a large installed base, and track the process (so that you can redo unsuccessful upgrades). The administrator can allow users to perform the updates optionally, or can launch the process automatically. The system does not detect conflicts; it simply provides the information -- but GraceLAN could easily export data to, say, HELP!, and use the information to make appropriate Upgrade Manager packages of software to install. And of course it could provide information to NetDistributor, Help! or any other product that reads tab-delimited files.

Unlike the other systems here, GraceLAN also collects information on pc systems -- as long as they're connected to an AppleTalk network (a fairly big if). Indicating the paucity of information easily available off pcs, it gets far less information, and doesn't even attempt to manage pc applications. (The Update Manager works only on Mac applications.)

Trik's NetDistributor performs much the same function as GraceLAN Upgrade Manager, using information provided either by GraceLAN or Status*Mac. (The founders of Trik left TechWorks last spring.)

MacVONK's NetOctopus has an InfoReporter (the surveying tool) that produces local configuration information, and an automated software installation tool. It is the first product to incorporate the Apple Compatibility Checker to find potential problems, and then lets the administrator resolve them. Likewise, **Version Territory** and **NetWork SuperVisor** handle installations and record-keeping, but pretty much leave the discovery and management of conflicts up to the system administrator. SuperVisor also provides network diagrams.

It's a joint effort

What's still needed is cooperation from the application developers. Apple is already encouraging them to design, define and publish AppleEvents in their programs so that their functions and data can be used by other applications or scripts or add-on interactive interfaces (see **Release 1.0**, 5-91). But the company as a whole doesn't seem to get the picture: Even without AppleEvents, programs can contain a wealth of information about themselves so that they can be properly identified, installed and configured to work with the local environment and other applications and data formats. Issues include installation routines and requirements (how to identify users, communicate with printers and so forth), what data formats are used, and so forth. One problem is to define a standard, machine-readable way to represent this information.

Aside from bugs and incompatibilities and constraints on the negative side, users and vendors such as Pharos and Teknosys also need application information on the positive side: Can Juan's word-processor handle Alice's e-mail? Can Alice's calendar understand Juan's appointment records? We've now got down to a fairly small group of standards, including basic AppleEvents, but that will expand again as applications get more complex and more object-oriented. Can Dimitri's inventory package correctly count the number of widgets Kolya has already promised to his customers?

So far, Apple's approach is the most advanced, with the beginnings of a registration system, but its own attempt at an application database is still narrow-minded: What's the first version in which you're compatible with System 7? What's your current version? This information, updated quarterly, is fed into the System 7 Compatibility Checker, a HyperCard stack which can check a user's system for compatibility problems with System 7.

Unfortunately, it doesn't address the applications' compatibility -- let alone interoperability -- with each other. That's a challenge left up to third parties, says Apple's System 7 marketing manager Ken Feehan. It's also a market opportunity, as Pharos and Teknosys recognize.

OVER IN THE DOS/WINDOWS WORLD...

The Mac products described above have been spurred by the need for some way to automate the mass migration to system 7. Why haven't we seen a similar explosion on the pc, to help with the move to Windows? Basically, there just isn't the same visibility in the environment, with resource files and peer-to-peer networking that would let an administrator manage a user's individual hard disk.

Nor is there much homogeneity, with the wide range of hardware, networks and applications in the DOS/Windows pc world. "We've been approached by several companies who'd like to fund the development of such a product for the pc, but for now there are just too many different platforms and too many problems and conflicts not just between applications but all those hardware devices," says Jay Stipe of Teknosys. "The Mac is set up very well to return all this information."

On the other hand, that makes the job even more worth doing for the pc. Microsoft is readying the necessary facilities, pretty much an offshoot of its current .INI (for initialization) files. Those are pretty free-form; they include any information the application developer wants to provide, in whatever form he wants to provide it (usually test). They are a loose version of Windows' .INI files, which record things such as the user's screen-layout preferences, fonts loaded and localization information (such as instructions to use the Russian interface and help files). .INI files are the equivalent of the Mac resource forks, but they haven't been as widely used. Unlike the Mac's resource forks, .INI files have no particular format across applications or required information, and they themselves are not required.

The next step is the evolving OLE-registration facilities, part of Microsoft's progress to object-orientation overall. When you register your application as an OLE object server, listing the capabilities and data formats it handles, that information goes into a small, extensible data file -- reg.dat, for registry -- that could also carry other information. The reg.dat file is in structured binary form. In OLE 2 (next year), it will contain object interface definitions and appropriate parameters.

In the future, in NT next year and in Windows 4 in 1993, the Microsoft operating systems will have a "registration database," which will collect and manage the information in the old reg.dat files. It will also have its own API so that applications and system integrators can update it directly using formal, standard terms. This registration database will also contain lots of other information, acting as the underpinning for Microsoft's object request broker and performing the services of a network directory.

Meanwhile, attention to the problem of DOS-based system configuration is coming primarily from a variety of third-party network configuration tools that may eventually expand to manage applications as well.

THE NETWORKING ANGLE

Rumor has it that IBM is about to bring back Charlie Chaplin, to recapture that old magic... But that won't work. Ten years ago, people needed to understand that computers could be friendly. Now people's concerns are dif-

ferent. Everyone knows computers are okay to use, but they're difficult to deal with. Once you've got one application, you're scared to try another. Once you've got one computer, you're still scared to hook up to another.

Personal computers are no longer standalone systems, running a single application for a single user. Instead, they're communication systems, running multiple applications for multiple users. There are printer drivers, communications ports, applications running somewhere else on a network. There are data files in a variety of formats, with data that could usefully be manipulated by a variety of applications. Objects fly all over the place.

How can anyone other than a full-time administrator manage such an environment? And how can a single administrator manage hundreds of such environments, each with its own configuration and peculiarities? In fact, no one can. The pc world is moving towards what we used to call a mainframe environment. Now we call it enterprise-wide computing -- a legitimate distinction because the systems used aren't mainframes, even though the administration problems are similar. Indeed, the problems are tougher, because there are usually different systems and configurations for each individual user, whereas once all users had identical terminals. (And of course there were fewer users anyway; mostly, people just got reports from the dp center.) Thus, neither pc operating systems nor dp facilities are really equipped for the enterprisewide environments of today.

Novell and DRI -- United we stand

Juan: *What's the difference between mergers and open-systems alliances?*
Alice: *Mergers produce products; alliances produce paper.*

That's basically why we're more excited about the merger of Novell and Digital Research than about the latest open-systems alliance or standards comedy. Right now, Novell owns the network and the server, while Microsoft -- or DRI -- owns the client. This division made a lot of sense when pcs were standalone and when servers were hosts that ran terminals, but no longer.

Now the dissonance between the two sides is the bane of every user's and every administrator's life. Client/server is a fine idea, but you can't just plunk any client and any server down together. The whole idea is to give them complementary interfaces so that they're insulated from each other and the promise -- any client with any server -- can be real.

That's the promise of openness: that if everyone adheres to standards they will get global interoperability. In practice, the attention to joint detail required to implement such interoperability is usually found only within a single company building two complementary parts, or when a market standard emerges and other vendors struggle to develop complementary (and competitive) products.

Thus DRI/Novell stands to gain an edge in a market where NetWare takes precedence over DOS (since it solves the more complex problems), and where DR DOS can be engineered to work better with NetWare. This means everything from avoiding the inevitable conflicts when two products are developed separately, to more fundamental resonances across the client/server divide. For example, says DRI DOS product marketing director John Bromhead, "From the

user's point of view they should have the same interface, the same commands and logical layout. Why should it be different to rename a directory across the network and at your own machine?" From the administrator's point of view, there should be more fundamental similarities in the underlying systems and how they're managed. For example (and note that this is DRI talking, not Novell imposing its will on its tiny new toy), there are things you just can't do now in DOS -- auditing, communications management, and so on.

The class distinction between clients and servers disappears

In the long run, there will be no operating-system distinction between client and server. (That's what peer-to-peer and objects are all about.) Any machine can act as a client on behalf of its own user, or as a server to some other machine on the system that makes a request of it. Typically, a request might ask for some data, but it could also be for use of some other system's or person's software package. Administrative tools will also work over the network, as described earlier. (In this case, the administrator is actually acting as a client of the pcs which do the work.)

What are the other benefits of an integrated client/server operating system? Mostly they are negative benefits -- fewer obstacles to doing the things you want to do. Why, for example, can you not use a modem or a CD-ROM or any of hundreds of other peripherals from a server just as you use it on a single machine? In principle, there's no reason, but somehow they're lacking a network driver and can't be run over the network.

Says Novell's director of NetWare Products marketing John Edwards: "If it were just one thing we could have done it with MS-DOS already. But it's a lot of little things. You just have to do them all. Our goal is to do it once, to be able to hold it up and say, 'See what I mean.'" Then, he hopes, the benefits will be clearer and the company will be able to provide the same integration benefits with other client systems and with SunSoft's Solaris. That may be a noble but unreachable goal. Certainly, the difficulty of achieving workable client/server operation is a strong point in favor of the merger.

Total seamlessness is going too far

On the other hand, we're not arguing that system resources should be invisible. Even though you don't want to know how your car works, you do want to know whether you're going too slow, running out of gas, etc. In the same way, networks can usefully inform people of the resources they're consuming: "Yes, you can get this piece of information, but do you realize we need to get it from Japan and it will take 20 minutes to search the database?" Or, "Sorry, you can't use this because we're only licensed for eight copies. Would you like to see a list of the other users?" Or, "There are two printers available: Do you want fast and cheap, or slow and high-quality?"

These kinds of messages require both plumbing and high-level self-awareness -- or self-description. The network and the operating system interface may know about the printers, but does your wp application know how to tell you? Can your operating system tell what your application is trying to do? In the end, not even the ideal operating environment goes far enough; the applications have to be in on it too.

RESOURCES & PHONE NUMBERS

Ken Feehan, Madeleine Harmath, **Apple Computer**, (408) 974-4567
Scott Gilbert, Renee Gilbert, **CSG Technologies**, (412) 471-7170; fax, (412) 471-7173
John Bromhead, Steve Tucker, **Digital Research**, 44 (635) 35304; fax, 35834 voice-mail, (408) 646-6069
Robert Beech, **Pharos Technologies**, (513) 984-9273; fax, (513) 984-1653
Jan DeRuiter, **MacVONK**, (215) 660-0606; fax, (215) 668-4360
Jim Allchin, Steve Ballmer, Jon Lazarus, Viktor Grabner, **Microsoft**, (206) 882-8080; fax, (206) 883-8101
John Edwards, **Novell**, (801) 429-3236; fax, (801) 429-3098
Tom Farley, Dana Bartholomew, **SoftWriters**, (512) 244-3999
Jay Stipe, **Teknosys**, (813) 620-3494; fax, (813) 620-4039
Dirk Johnston, Mike Sullivan, **TechWorks**, (512) 794-8533 or (800) 395-7924; fax, (512) 794-8520
Duane Tharp, Mark Krenek, **Trik**, (512) 443-2252 or (800) 766-0356; fax, (512) 443-1888

COMING SOON

- *ObjectSoft.*
- *Performance support.*
- *Tivoli Systems.*
- *Machine-assisted translation.*
- *The Douglas brothers -- Hofstadter and Lenat.*
- *The coming information crash.*
- *Application servers.*
- *And much more... (If you know of any good examples of the categories listed above, please let us know.)*

PC Forum 1992: A NEW LANDSCAPE
See you in Tucson February 23 to 26!

RELEASE 1.0 CALENDAR

September 11-14	**Software Publishers Association annual conference** - Orlando. Sponsored by SPA. Call Ken Wasch, (202) 452-1600.
September 12-14	***ETRE** - Opio, France. Sponsored by Dasar. Call Alex Vieux, (415) 321-5544.
September 22-24	***Agenda 92** - Laguna Niguel, CA. Sponsored by P.C. Letter/PCW Communications. Call Tracy Beiers, (415) 592-8880.
September 25-27	**Second European conference on computer-supported cooperative work** - Amsterdam. Knowledge workers and academics, unite! Organized by the University of Amsterdam. Call Mike Robinson or Liam Bannon, 31 (20) 525 1250/1225; fax, 31 (20) 5251211; e-mail, Bannon@learn.ucd.ie; or Charlie Grantham, 1 (415) 370-174; cegrant@well.sf.ca.us.
Sept 30-Oct 2	**Computer Intelligence client forum** - San Diego. Sponsored by Computer Intelligence, InfoCorp, StoreBoard. Call Nancy Pantone, (619) 535-6756 or Cari Gold, (619) 535-6755.
Sept 30-Oct 4	***Seybold Conference** - San Jose. The leading event in the computer publishing community. Sponsor: Seybold Seminars/ Ziff. Call Kevin Howard or Beth Sadler, (213) 457-5850.
Sept 30-Oct 5	**OpCon East** - Cambridge. The East-coast session of Soft·letter's twice-yearly conference for operations managers. Call Tom Stitt, (617) 924-3944.
October 1-3	**INFO '91** - New York City. Sponsored by Cahners Exposition Group. Call Marilyn Harrington, (203) 352-8477.
October 3-4	**Lap&Palmtop '91** - Chicago. Sponsored by Laptop Expositions. Call Peter O'Connor, (212) 682-7968.
October 6-11	***OOPSLA '91** - Phoenix. Sponsored by ACM. Call John Richards, (914) 784-7731.
October 7-11	***Interop '91** - San Jose. Sponsor: Advanced Computing Environments/Ziff. All equipment on display must work together by being connected to the show network. With Ellen Hancock, IBM Communication Systems. Call Wendy Gibson, (415) 941-3399.
October 9-11	**Artificial intelligence applications on Wall Street** - New York City. Sponsor: Polytechnic University. Speakers include Susan Garavaglia, Chase Manhattan Bank; John Diesem, American Stock Exchange. Call Edward Racz, (7180 260-3760.
October 13-16	**SIGIR '91** - Chicago. International conference on research and development in information retrieval. Sponsored by ACM. Call Janet Walker, (409) 845-0298.
October 14-16	**The Seybold executive forum: Workgroup technologies and organizational learning** - Glen Cove, Long Island, NY. Sponsor: Patricia Seybold's Office Computing Group. Call Jeffrey Perfect, (617) 742-5200.
October 15-16	**Residential telecommunications** - Washington, DC. Sponsored by TeleStrategies. Call Jerome Lucas, (703) 734-7050.
October 15-17	***NetWorld '91** - Dallas. Sponsored by Bruno Blenheim. Keynote by B. Garland Cupp, American Express Travel. Call Annie Scully, (201) 569-8542 or (800) 444-EXPO.
October 15-17	**CD-ROM Expo** - Washington, DC. Sponsored by World Expo Corporation. Call Terry Merrell, (508) 879-6700.
October 16-18	**EDUCOM '91** - San Diego. Sponsored by University of California at San Diego. Speakers include Sheryl Handler, Bill Joy. Call Diane Balestri, (202) 872-4200.

October 18-20	**Hackers conference** - North Lake Tahoe, NV. Sponsor: The Point Foundation. Call Glenn Tenney, (415) 574-3420.
October 20	***Comdex international marketing forum** - Las Vegas. Sponsored by the Interface Group. A look at pc business opportunities outside North America. Call Elizabeth Moody, (617) 449-6600.
October 21-25	***Comdex** - Las Vegas. So wonderful they couldn't wait until November? Whatever the reason.... Sponsored by Interface Group. Call Elizabeth Moody or Dick Blouin, (617) 449-6600. And while you're there...
October 22	***JUMPS for Pen-Computing** - Las Vegas. Sponsored by Japan Entry. "Japan-U.S. marketing partnership summits. Keynote by Esther Dyson. Call Chris Payne-Taylor, (508) 352-7788.
October 21-23	**SGML '91** - Providence, RI. Sponsored by Graphic Communications Association. Call Joy Blake, (703) 519-8160.
October 21-23	**Twelfth annual Alex. Brown technology seminar** - Baltimore. Primarily for investors. Call Lori Bresnick, (301) 727-1700.
October 27-29	**The Classic** - Monterey, CA. Sponsored by the American Electronics Association, for cute companies and eager investors. Call Flo Lewis, (408) 987-4200.
October 28-29	**Pricing conference & seminar** - Chicago. Sponsor: The Pricing Advisor. Call Anita Farley, (404) 252-5708.
October 28-30	**Electronic Messaging '91: Taking care of business** - New Orleans. Sponsor: Electronic Mail Association. Keynote: Ellen Hancock, IBM. Call Mike Cavanagh, (703) 875-8620.
October 29-30	***39th annual marketing conference** - New York City. Sponsored by The Conference Board. With Esther Dyson. Call Jean McNulty, (212) 980-7014.
Oct 30-Nov 1	**UNIX Expo** - New York City. Sponsor: Blenheim Expositions. Keynote by Steve Jobs. Call Pam O'Neill, (512) 343-1111.
November 4-7	***ADAPSO fall management conference** - San Francisco. Sponsored by ADAPSO. Call Shirley Price, (703) 284-5355.
November 6-7	**Microprocessor Forum** - San Francisco. Sponsored by Microprocessor Report. Keynote by Gordon Bell. Call Mark Thorson, (707) 823-4004.
November 7-9	**1991 nanotechnology conference** - Palo Alto. Sponsored by Stanford, Tokyo University, Foresight Institute. All about molecular nanotechnology: complete three-dimensional structural control of materials at the molecular level. Call Chris Peterson, (415) 948-5830.
November 10-13	****Second East-West High-Tech Forum** - Warsaw (Prague in 1992). Sponsored by EDventure Holdings. With a roster of serious-minded entrepreneurs and vendors from East and West. Don't just come to listen to advice; come to mingle with the people making it happen. Call Daphne Kis, 1 (212) 758-3434 or fax (212) 832-1720; MCI Mail: EDventure, 443-1400.
November 12-14	**Unicom '91** - Washington, DC. Sponsored by North American Telecommunications Ass'n. Call Susan Ryba, (202) 296-9800.
November 13-15	**LAN/WAN support forum** - Washington, DC. Sponsored by the Help Desk Institute. Call Elaine Worthington, (719) 531-5138 or (800) 248-5667.
November 17-20	**IIA annual convention** - Orlando. Sponsor: Information Industry Association. Call Linda Cunningham, (202) 639-8262.
November 17-22	**Twelfth annual XPLOR conference** - Phoenix, AZ. Sponsored by XPLOR International. Call Robert Wert, (213) 373-3633.

November 18-22	**C++ at work conference** - Santa Clara. Sponsored by C++ Report and Wang Institute. With Adele Goldberg and Philippe Kahn. Call Chantal Olson, (508) 649-9731.
November 19-21	**PC Expo** - Chicago. Sponsored by Bruno Blenheim. Call Steve Feher, (201) 569-8542 or (800) 444-EXPO.
November 21-22	**UNIX & Open Systems 91** - Brussels, Belgium. Sponsors: Unican, Datapro and X/Open. Speaking: Walter de Backer, informatics, EC; Geoff Morris of X/Open; Ed Borkovsky of Unican. Call Rene Beil, 32 (2) 224-3007; fax, 32 (2) 219-8643.
December 2-4	***Alliance 91** - Tokyo, Japan. Sponsored by Harvard Business School Ass'n. Strategic alliances with Japanese companies. Call Mark Francis or Yasuhito Mikamo, (415) 742-0757.
December 3-5	**European Publishing conference** - The Hague, Holland. Sponsored by Seybold Seminars. Contact: Laurel Brunner, 44 (323) 410561 fax, 44 (323) 410279.
December 15-18	***Hypertext '91** - San Antonio, TX. Third international conference on hypertext. Sponsored by ACM. Call Janet Walker, (409) 845-0298, e-mail leggett@bush.tamu.edu.
January 26-29	***Demo '92: The annual personal computer industry product review and demonstration** - Palm Springs, CA. Sponsor: P.C. Letter/PCW Communications. Call Tracy McGee, (415) 592-8880.
February 11-13	***NetWorld 92** - Boston. Sponsor: Bruno Blenheim. Call Annie Scully or Mark Haviland, (800) 444-3976 or (201) 569-8542.
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March 3-6	***ADAPSO spring management conference** - New Orleans. Call Shirley Price, (703) 284-5355.
March 11-18	**Hannover Fair CeBIT '92** - Hannover, Germany. Sponsor: Hannover Fairs USA. Call Donna Peterson Hyland, (609) 987-1202.
March 18-20	***Second Computers, Freedom and Privacy Conference** - Washington, DC (in the lion's den). Sponsored by Computer Professionals for Social Responsibility and the Electronic Frontier Foundation. Contact: Lance Hoffman, (202) 994-4955; fax, (202) 994-0227.
March 18-21	***SPA spring symposium** - Seattle. Call Karen Johnson, (202) 452-1600.
Mar 30-April 1	**Windows & OS/2 conference** - San Jose. Sponsored by PC Week and CM Ventures. Call John Bourgein, (415) 601-5000.
April 6-9	**Spring Comdex** - Chicago. Sponsored by the Interface Group. Call Elizabeth Moody, (617) 449-6600.
April 6-9	**SunWorld Expo** - Santa Clara. Sponsored by World Expo Corporation. Call Ron Toran, (508) 879-6700 or (800) 545-EXPO.
April 6-10	***COMTEK '92** - Moscow. Co-sponsors: ComputerLand Moscow, Business Week International, PC Week/USSR, Crocus. Call Steve Woods, (203) 834-1122; fax, (203) 762-0773.
April 22-24	***Asilomar microcomputer workshop** - Asilomar, CA. Sponsored by IEEE. Call Brian Berg, (408) 741-5010.
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